

Outbreaks and Public Health Responses

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Outbreak Components

1. Detect
2. Confirm
3. Characterize
4. Survey
5. Intervene
6. Prevent

Outbreak Components

1. Detect
 - Laboratory result, *N. meningitidis*
 - Syndrome e.g., Toxic Shock
2. Confirm
3. Characterize
4. Survey
5. Intervene
6. Prevent

Outbreak Components

1. Detect
2. Confirm
 - Consistent clinical symptoms, e.g., stiff neck
 - Confirmatory pathogen, *S. aureus*
3. Characterize
4. Survey
5. Intervene
6. Prevent

Outbreak Components

1. Detect
2. Confirm
3. Characterize
 - Define person, place, and time
 - Identify risk factors
4. Survey
5. Intervene
6. Prevent

Outbreak Components

1. Detect
2. Confirm
3. Characterize
4. Survey
 - Determine the magnitude
 - Identify additional cases
5. Intervene
6. Prevent

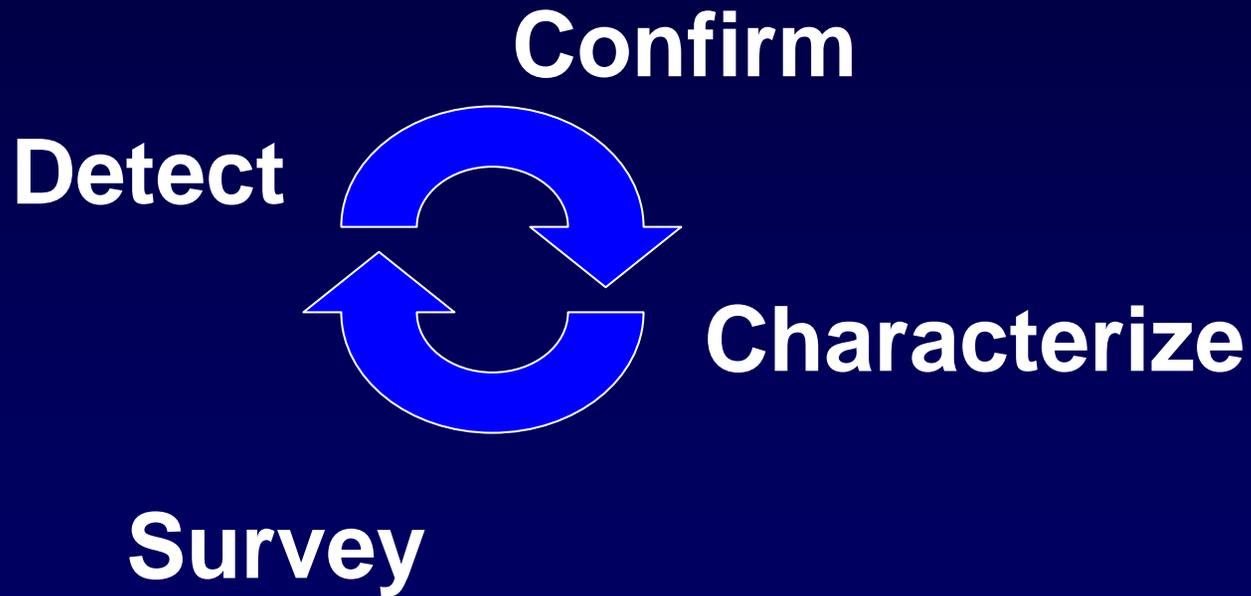
Outbreak Components

1. Detect
2. Confirm
3. Characterize
4. Survey
5. Intervene
 - Communicate findings
 - Stop transmission source
6. Prevent

Outbreak Components

1. Detect
2. Confirm
3. Characterize
4. Survey
5. Intervene
6. Prevent
 - Implement protective measures
 - Vaccinate

Outbreak Components



Outbreak of
Burkholderia cepacia



B. cepacia



- **Detect:** Hospital detects cases of *Burkholderia cepacia* among cystic fibrosis patients
- **Confirm:** PFGE shows common strain
- **Characterize:**
 - All used a commercial nasal spray
 - Spray culture grows *B. cepacia*
- CDC contacted to assist



B. cepacia



- **Survey:**
 - Develop a surveillance case definition
 - Notify HDs and Hospitals through EpiX, HAN, EIN, ClinMicroNet
 - Collaborate with outside researcher
 - Set up call-in number for possible cases
- **Intervene/Prevent:**
 - Notify clinicians
 - Recall nasal spray



B. cepacia

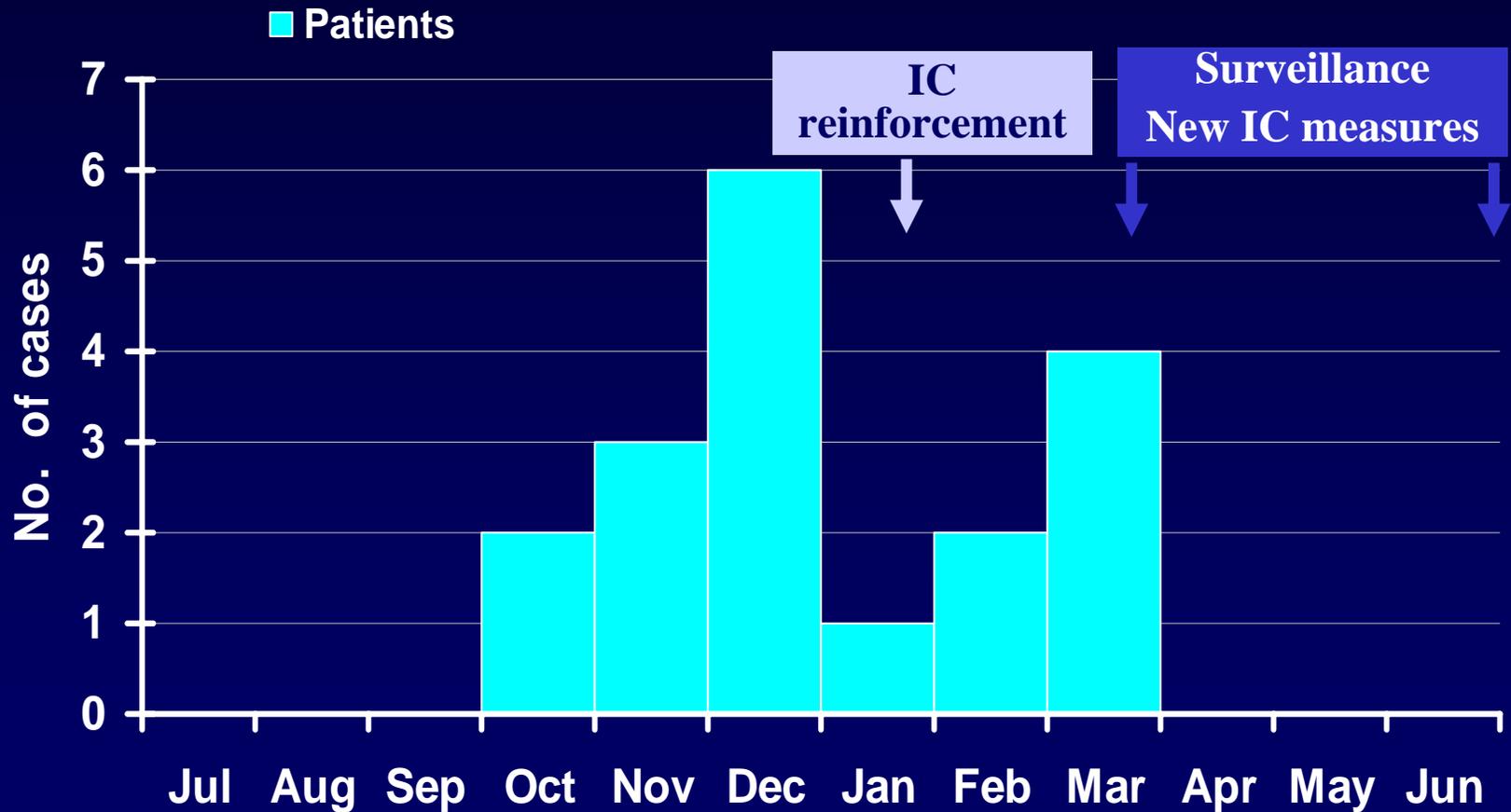


- **Detect:** Surveillance identifies outbreak of *B. cepacia* in VA hospital, first cases had used nasal spray
- **Confirm:** PFGE shows common strain in patients
- **Survey:** Surveillance at hospital identifies additional cases
- **Characterize:** Case-Control study to identify transmission factors
- **Intervene:** Enhance infection control

Determine the Person, Place, and Time

Patients with *B. cepacia* Cultures,
June 2003 to June 2004, Hospital A, MO

Total n = 18



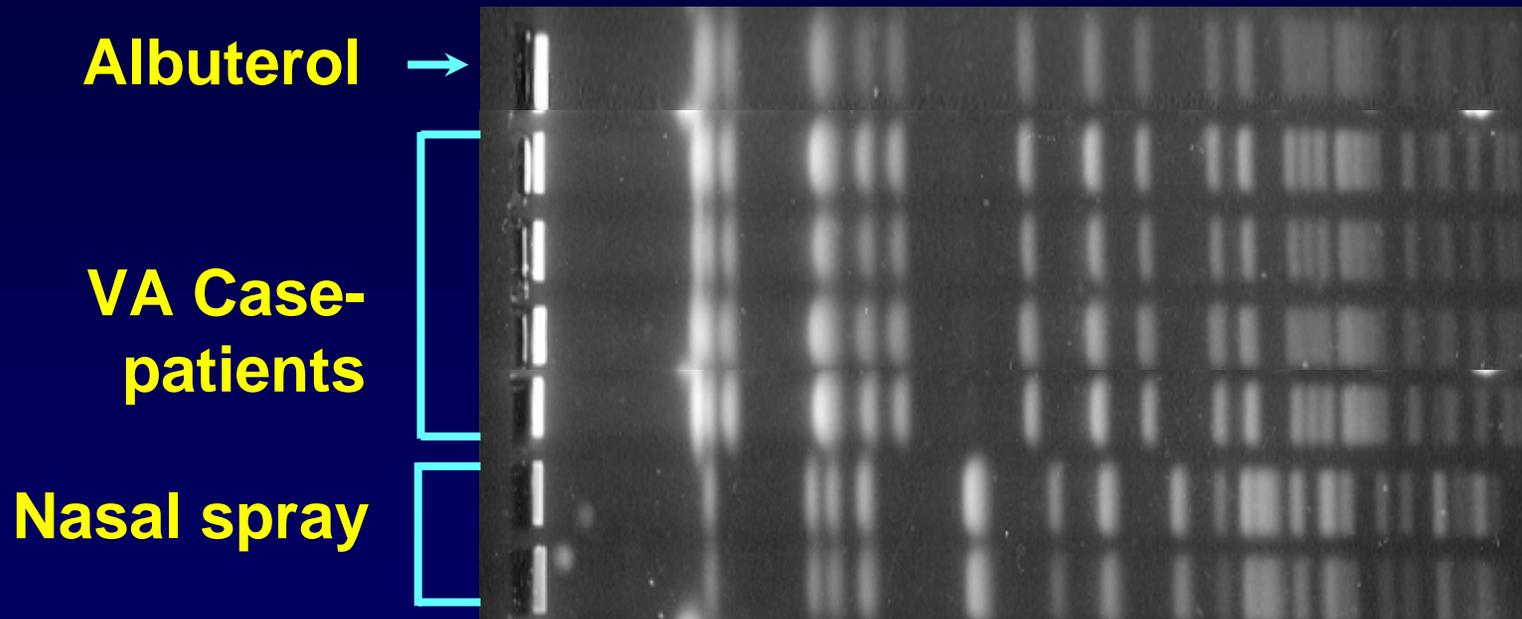
Characterize with Case-Control Study

Factors Associated With *B. cepacia* Infection/Colonization

Exposure	Cases	Controls	mOR*	95% CI	P
	N=18 N (%)	N=18 N (%)			
Hospital > 6d	13 (72)	7 (39)			0.04
Ventilator	12 (67)	4 (22)	9.0	1.5 – 199	0.01
Vancomycin	11 (61)	3 (17)	9.0	1.48 - 199	0.03
Nebulized albuterol	17 (94)	14 (78)	4.0	0.5 – 99	0.18
Nasal spray	0 (0)	0 (0)			

* Mantel-Hanszel matched odds ratio

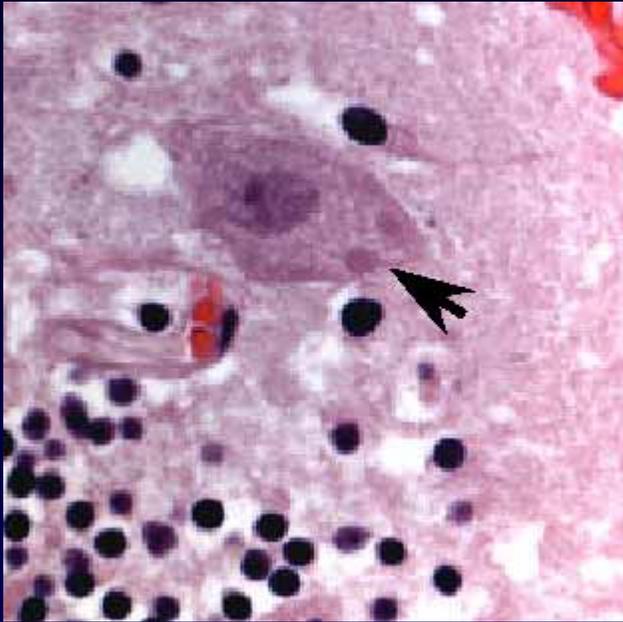
Pulsed-Field Gel Electrophoresis



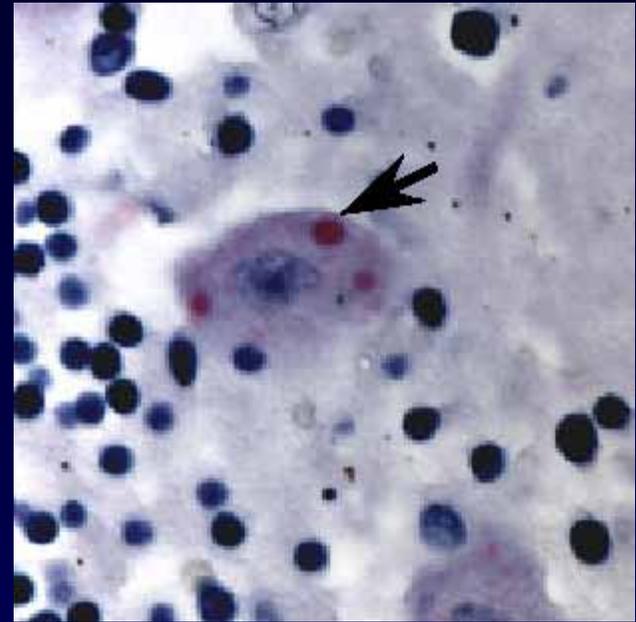
Unexplained Encephalitis in Organ Transplant Patients

Unexplained Encephalitis

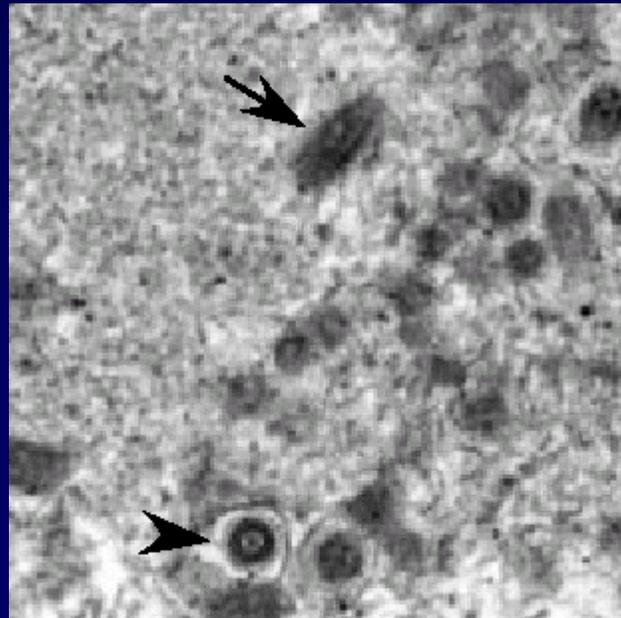
- **Detect:**
 - Unexplained encephalitis in organ transplant recipients
- **Confirm:**
 - Multiple tests negative by IHC, in situ hybridization, serology, culture
 - Suckling mice brain path makes diagnosis



H&E

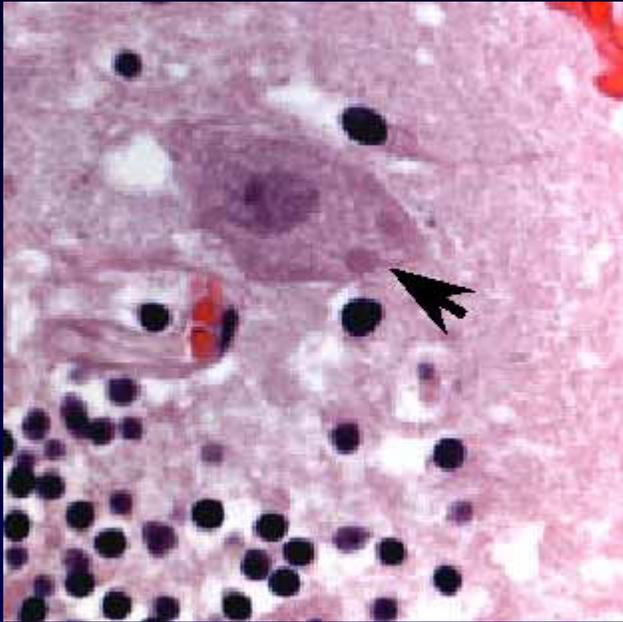


IHC

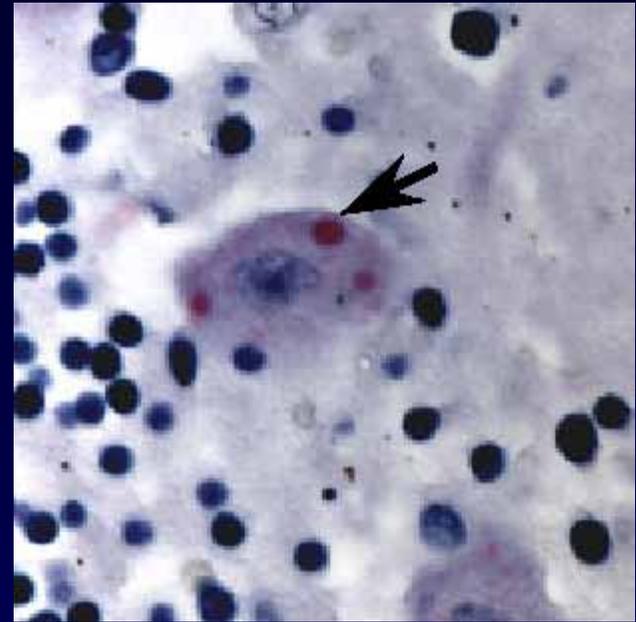


EM

Zaki, Paddock,
Shieh, Guarner
IDPA, CDC

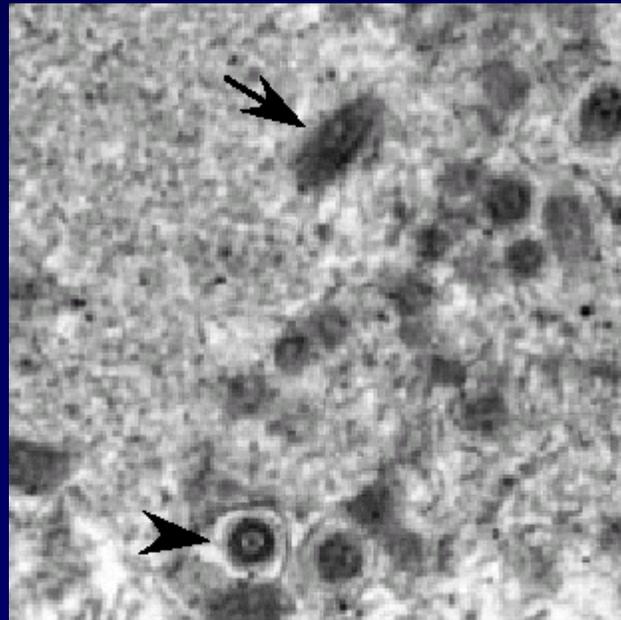


H&E



IHC

Rabies



EM

Zaki, Paddock,
Shieh, Guarner
IDPA, CDC

Rabies in Organ Recipients

Survey:

- Further path review identifies one more case
 - Nosocomial?
 - Coincidence?

Characterize:

- Stored vessel for liver transplant was used in a subsequent patient
- Unused tissues kept in a “Vessel Bank”

Intervene/Prevent:

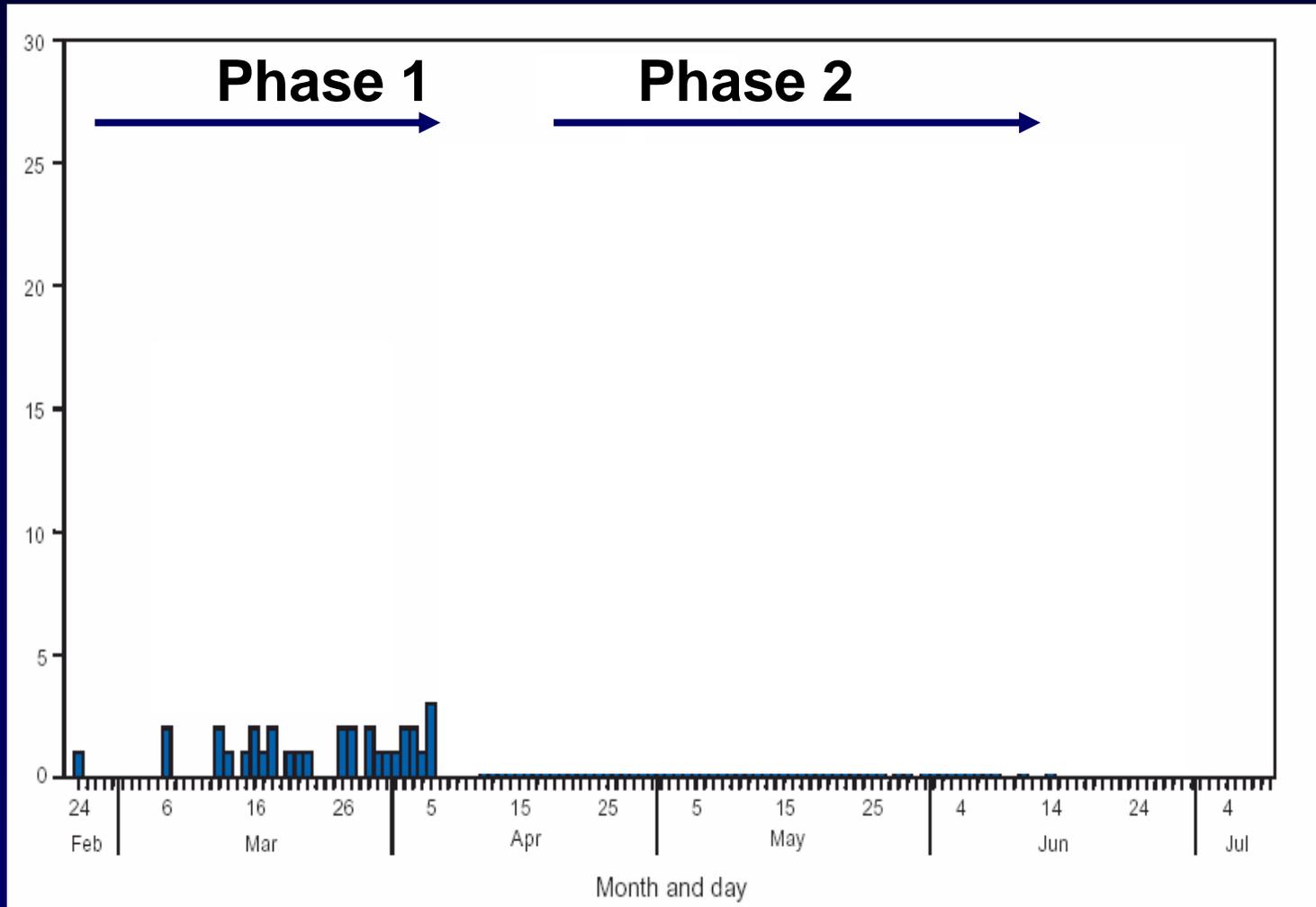
- New rules from JCAHO, AABB, communicate findings



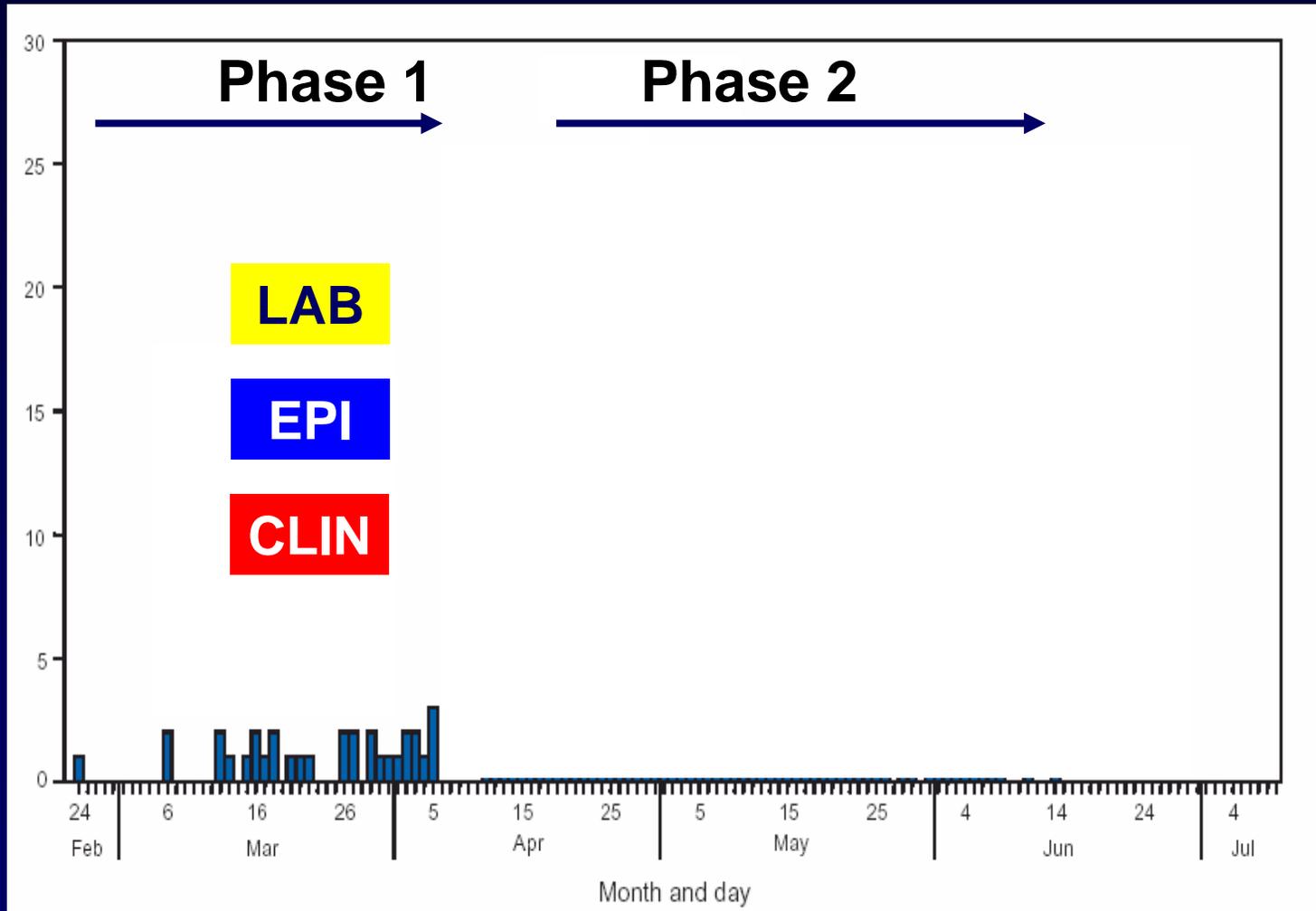
Responding to SARS in Taiwan



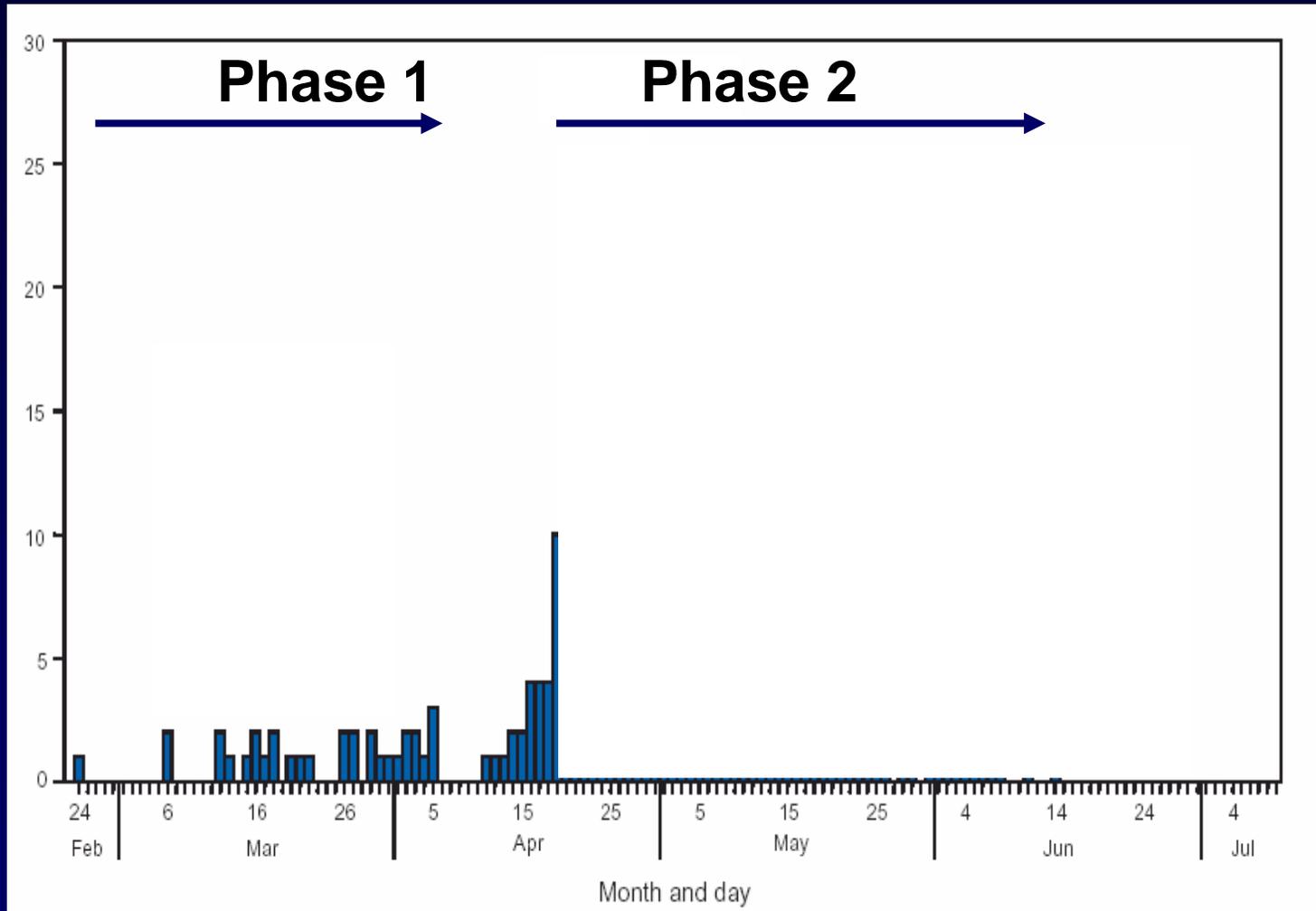
Taiwan SARS Phase 1



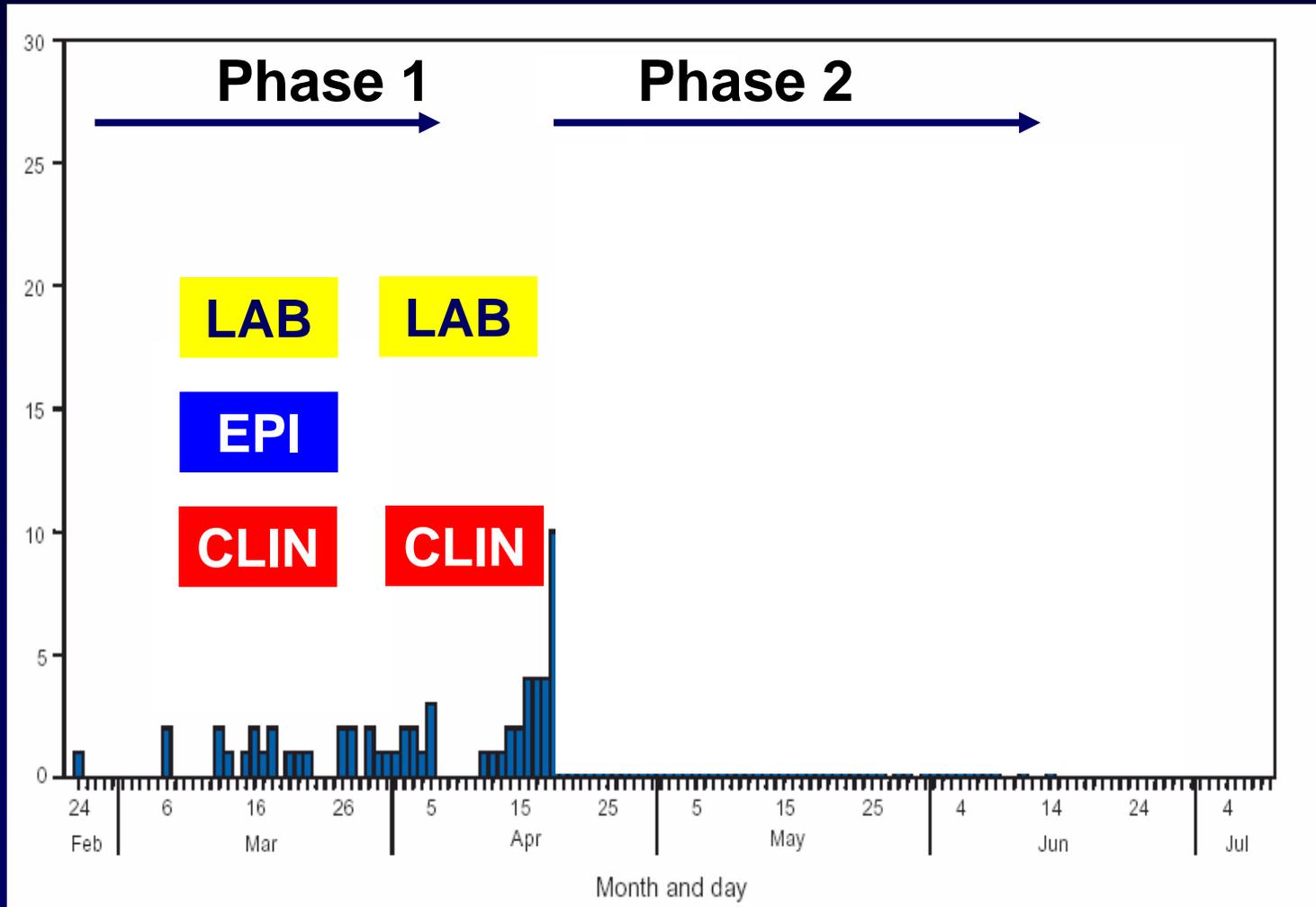
Taiwan SARS Phase 1



Taiwan SARS Phase 1



Taiwan SARS Phase 1

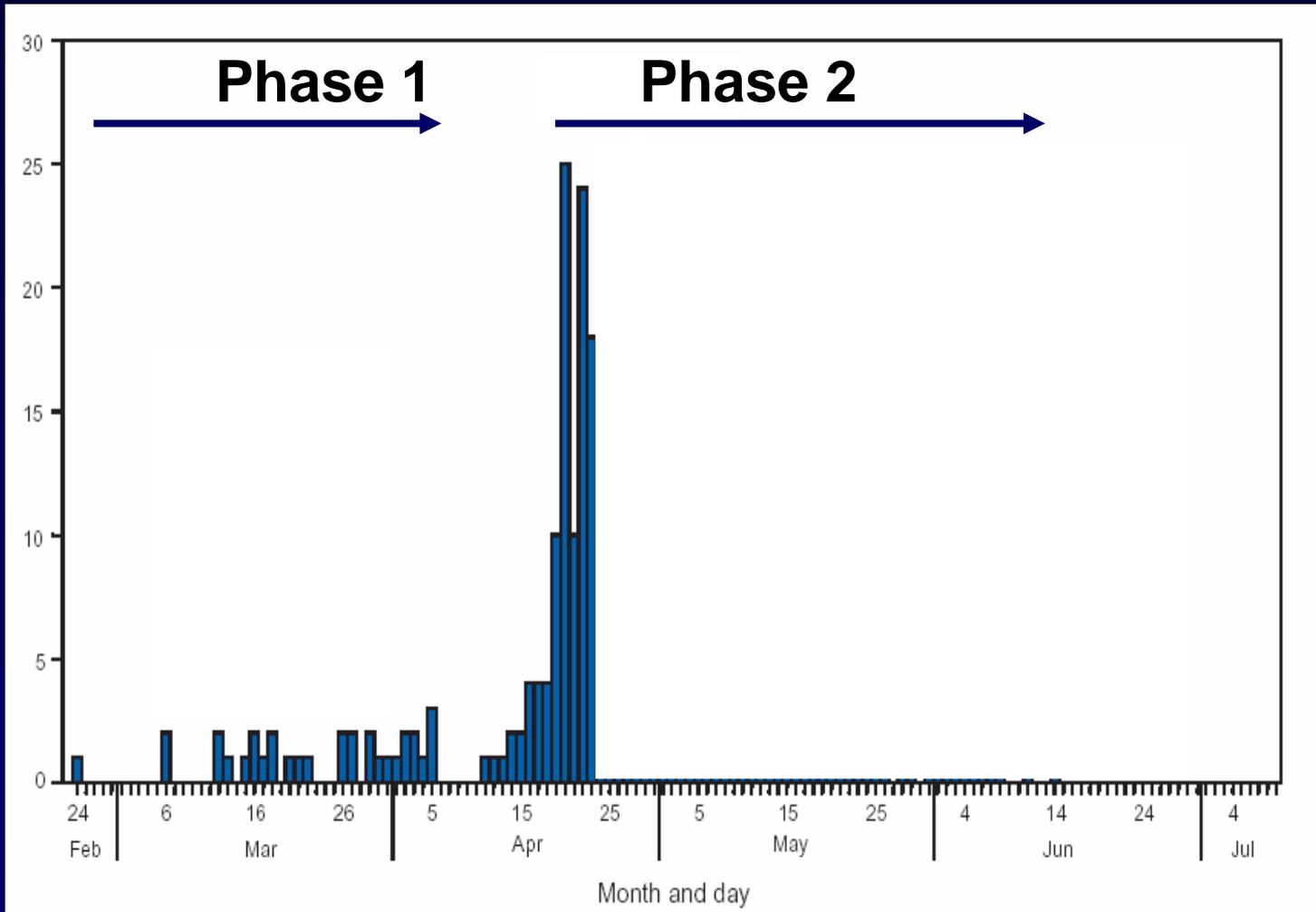




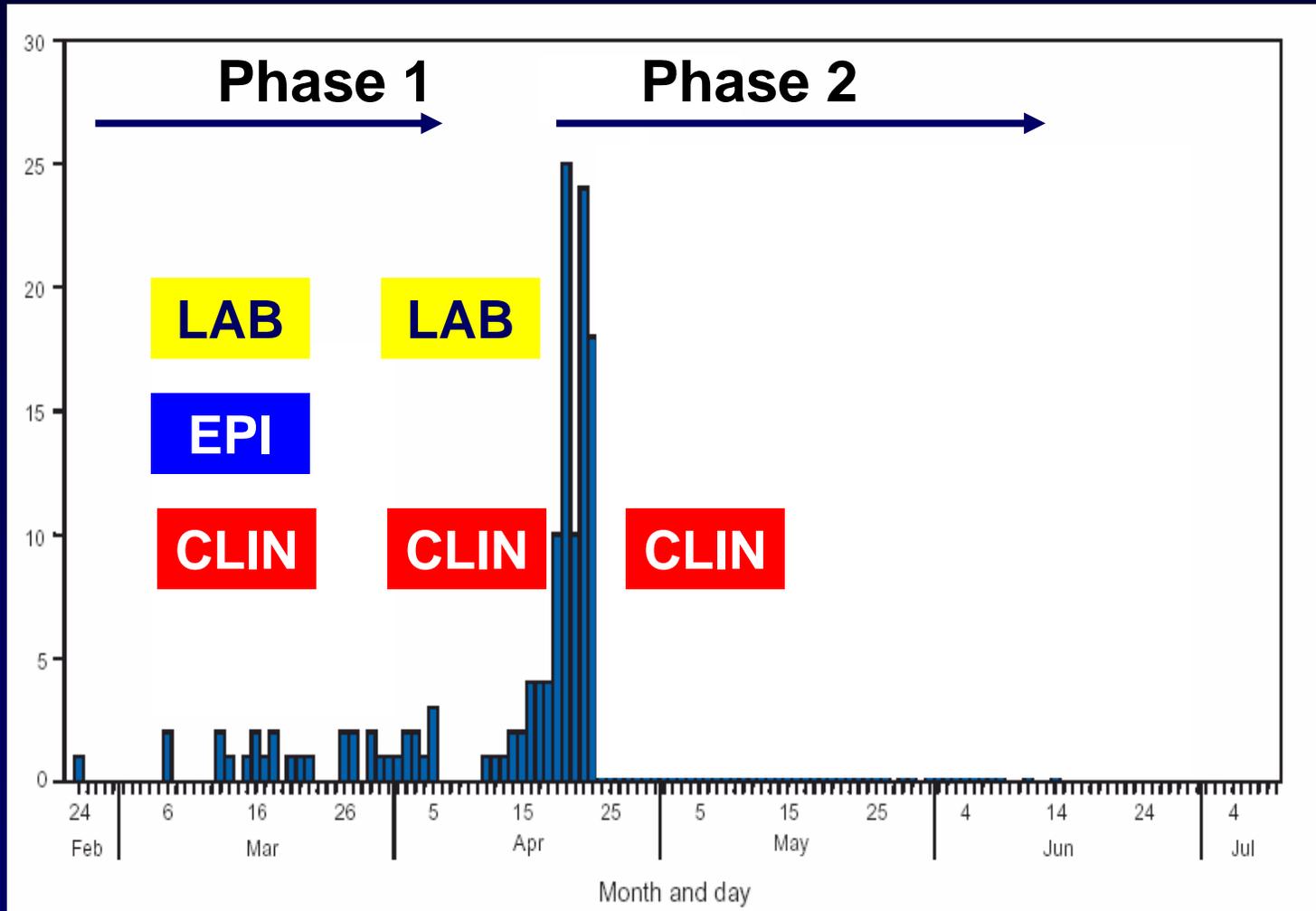
臺北市 和平醫院
TAIPEI MUNICIPAL HOPING HOSPITAL

以上的Y公Y駕
注流感疫苗

Taiwan SARS Phase 2



Taiwan SARS Phase 2

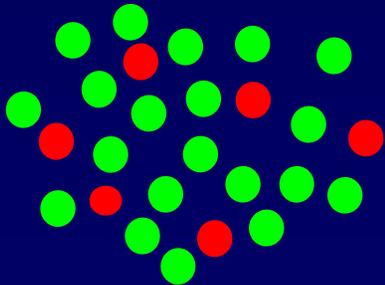






Suspect
Case
Definition

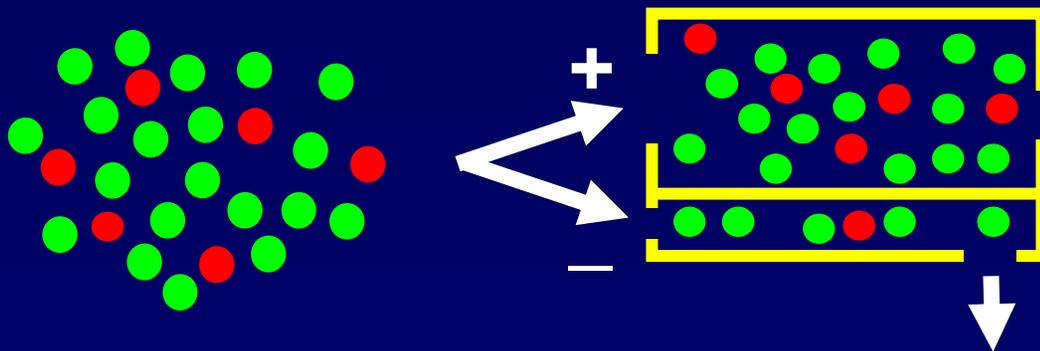
CLIN





Suspect
Case
Definition

CLIN





Suspect
Case
Definition

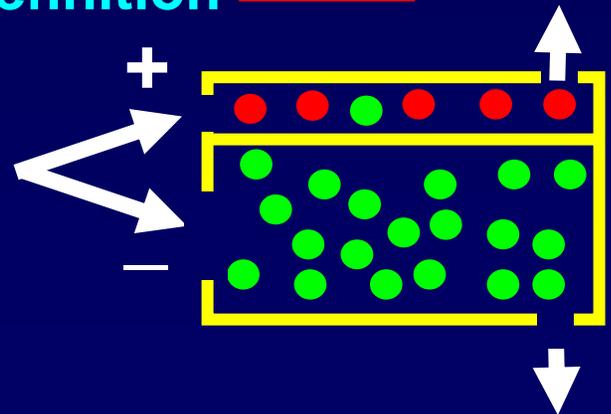
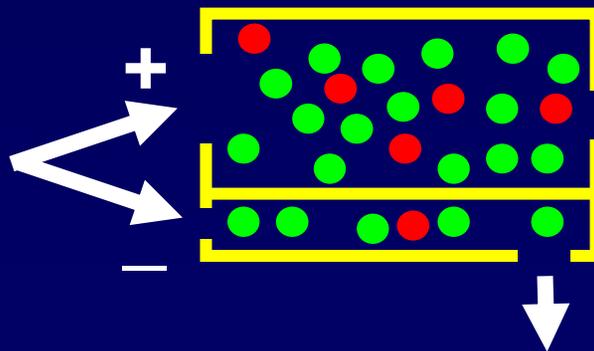
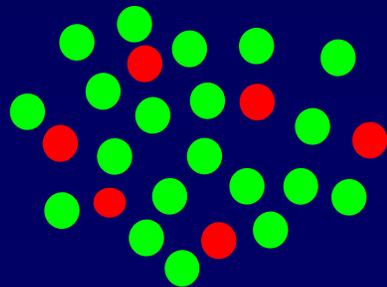
CLIN

Confirmed
Case
Definition

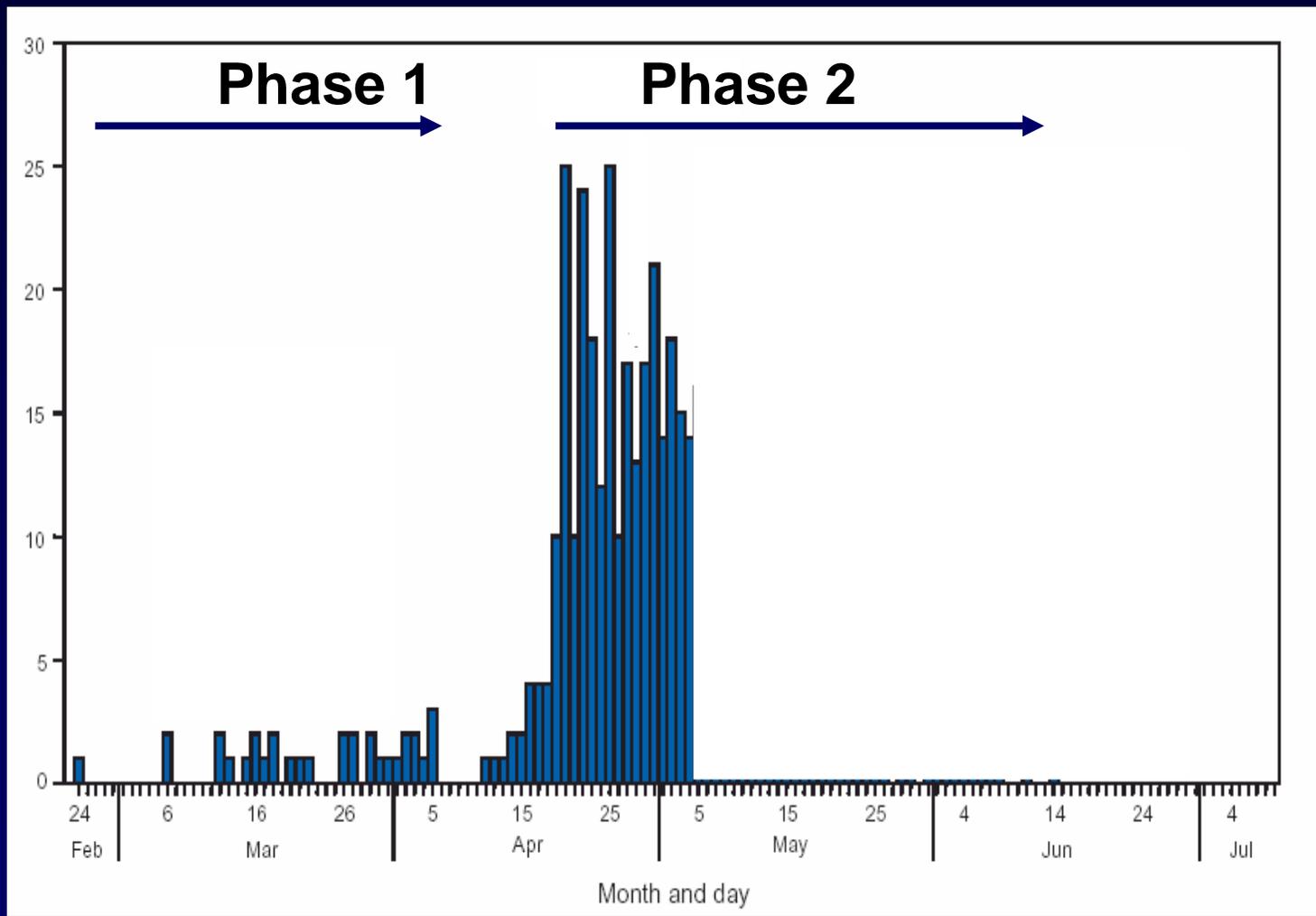
CLIN

EPI

LAB



Taiwan SARS Phase 2



Community Response: Required Fever Screening for Public Buildings



Community Response

Mandated Mask Use for

- Travel on public transport
- Taxi drivers



Community Mobilization: Population-wide Body Temperature Monitoring Campaign and SARS Hotline



Community Response: Community Disinfection



City Disinfection, Taiwan

djernigan@cdc.gov

Border Responses



HEALTH ALERT NOTICE

건강 경보 공지사항

KHUYẾN CÁO Y TẾ

健康に関する注意喚起

AVIS D'ALERTE MÉDICALE

AVISO DE ALERTA DE SALUD

緊急保健通告

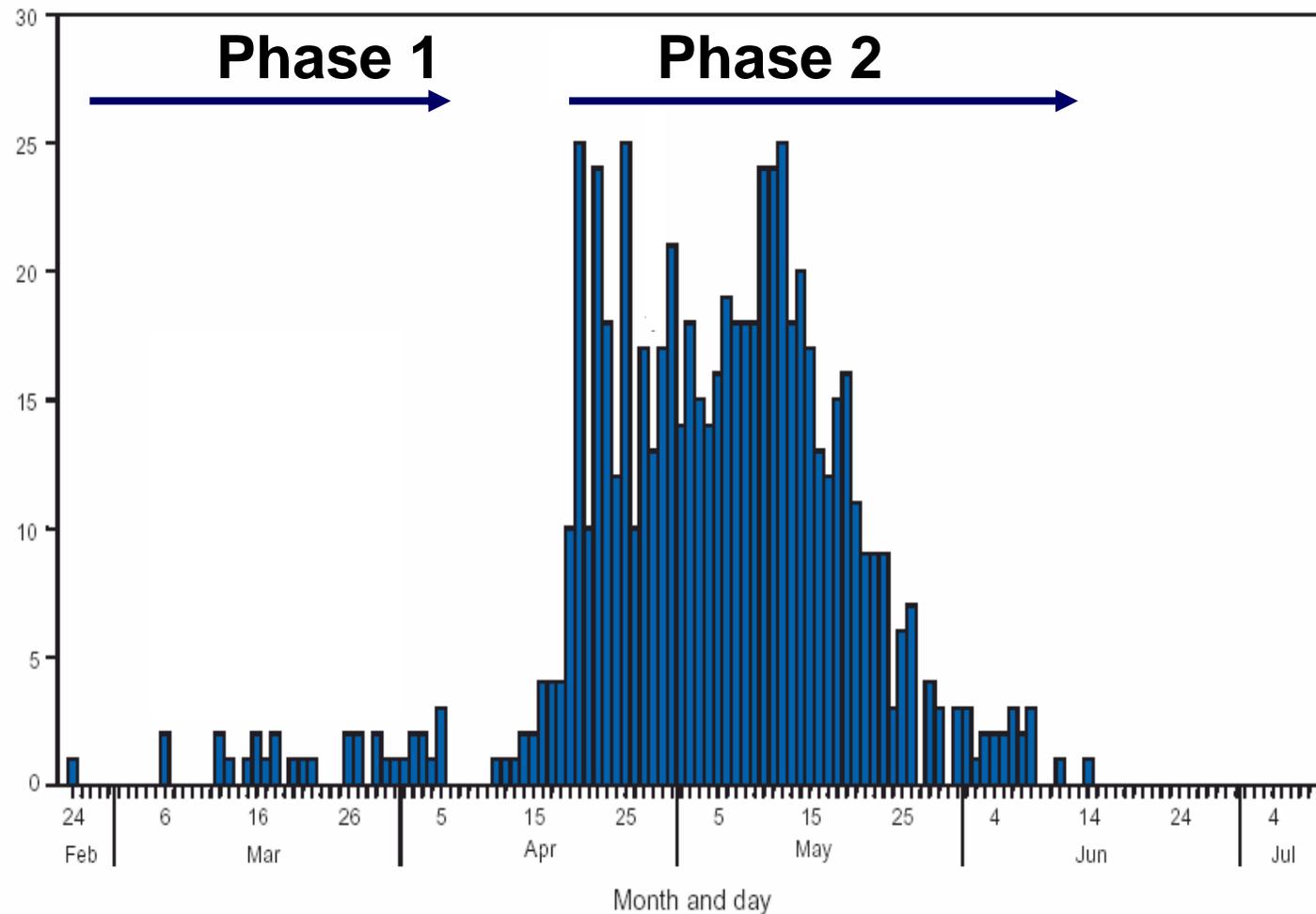
緊急保健通告



DEPARTMENT OF HEALTH AND HUMAN SERVICES



Taiwan SARS Phase 2



Hurricane Katrina Response



Katrina Response

- Loss of infrastructure in Louisiana
- Repeated displacement of evacuees
- Delay in getting adequate medical care
- Monitoring
 - Multiple possible pathogens
 - Multiple places for evacuees

Katrina Response

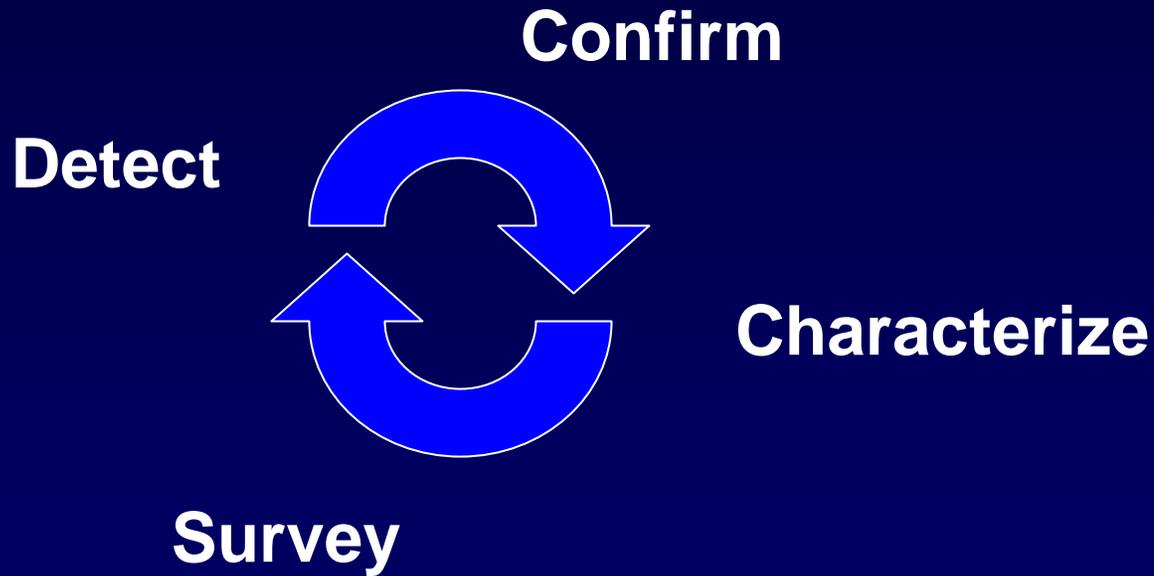
- **Detect:** What?
- **Confirm:** What?
- **Characterize:** What?
- **Survey:** For everything.
- **Intervene/Prevent:** Broadly



Katrina Response

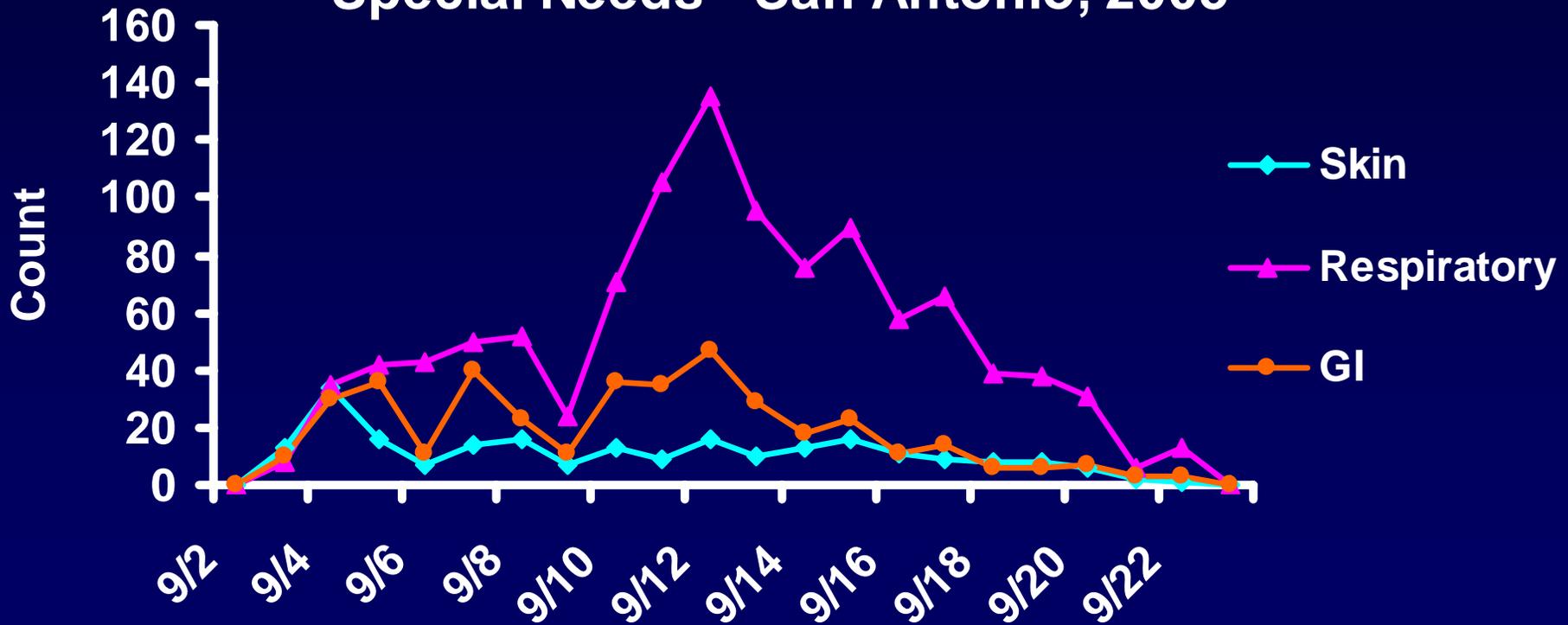
- CDC initiates Emergency Operations Center
- Stands up “Outbreak Team”
 - Epi & Lab staff in pathogen-specific areas ready to respond if needed
- Deploys teams to shelter areas to monitor syndromes

Katrina Response

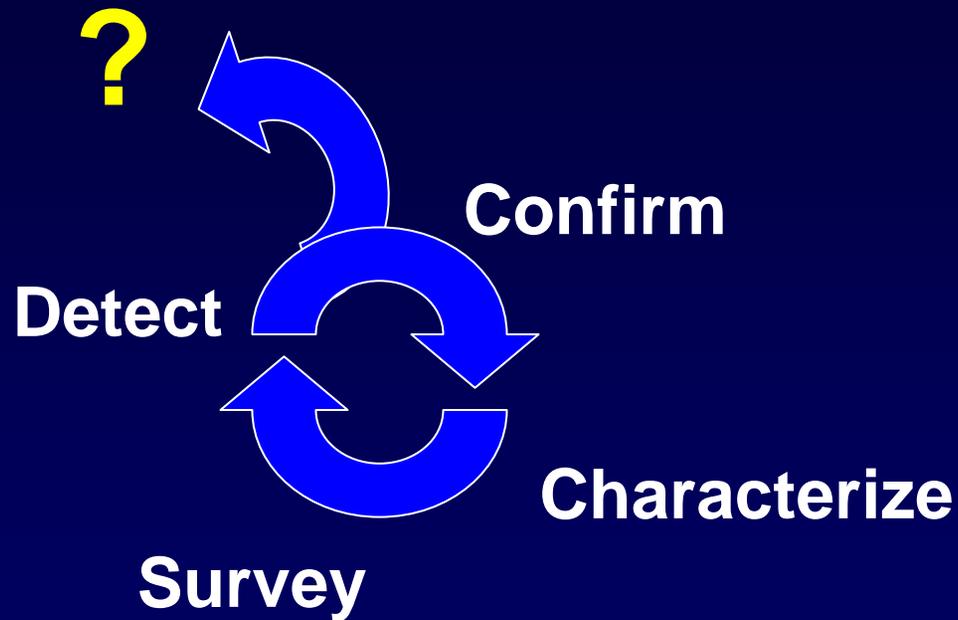


Syndromic Surveillance

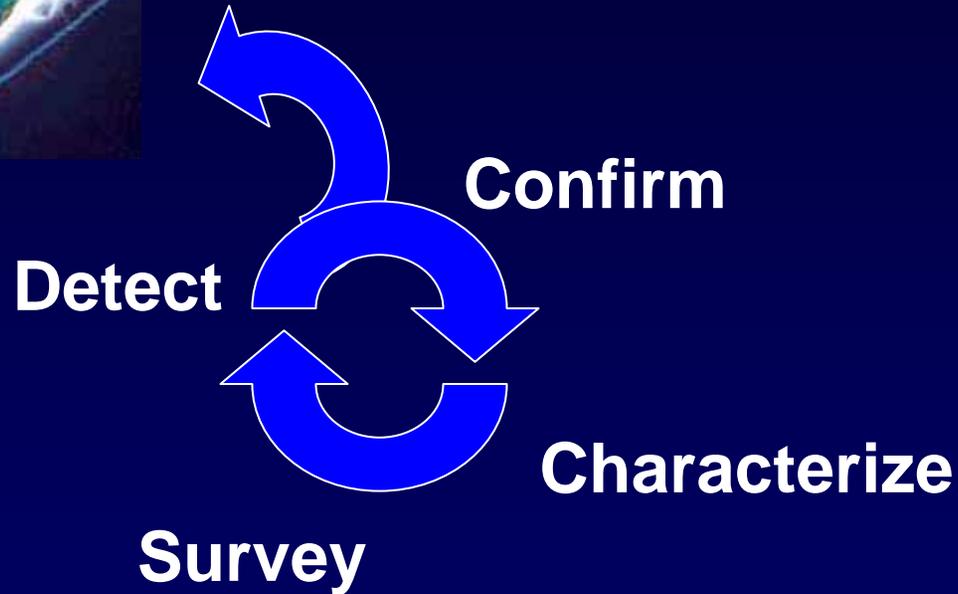
Syndrome Count over Time in 1536, 171, WPM, Special Needs-- San Antonio, 2005



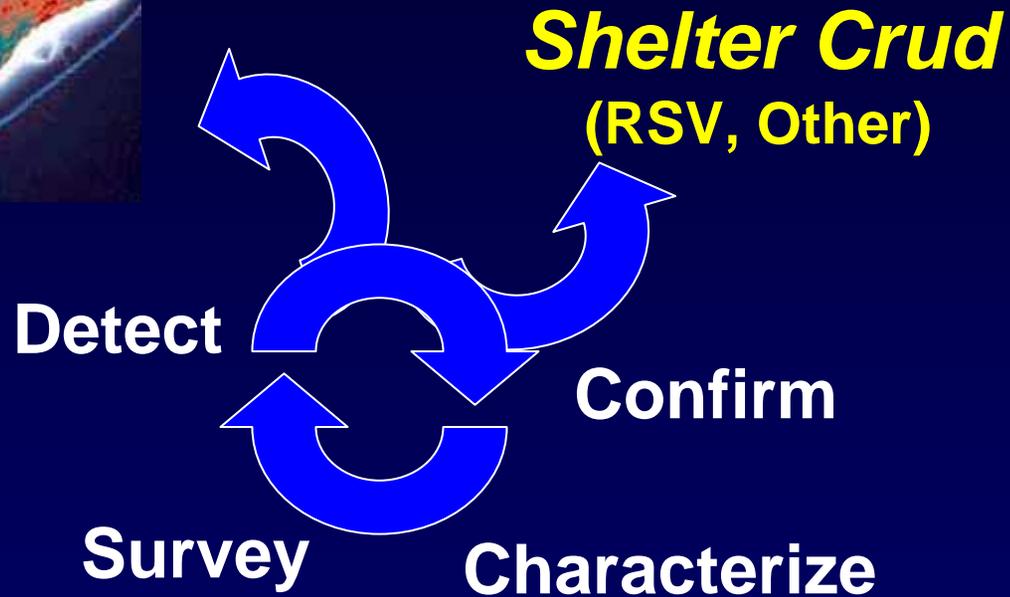
Katrina Response



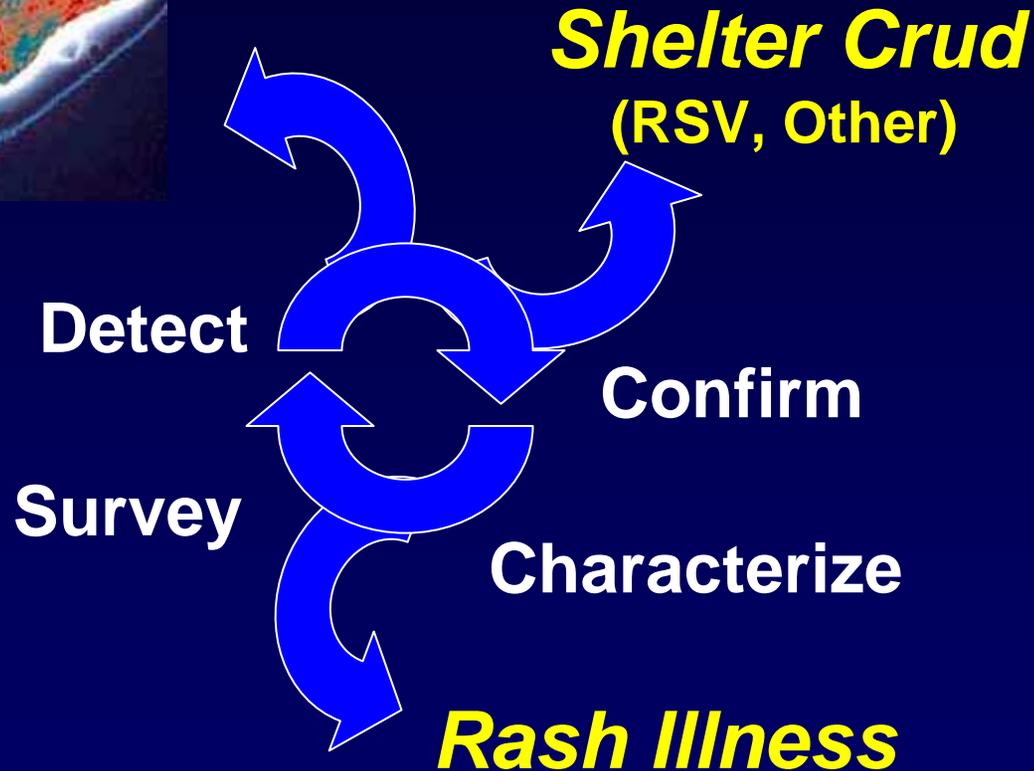
Katrina Response



Katrina Response



Katrina Response





Rash
Illness

“Cajun Crabs”



Rash Illness

**“Cajun Crabs”
(Mite Dermatitis)**



Rash Illness

**“Cajun Crabs”
(Mite Dermatitis)**



“Katrinapox”



**“Cajun Crabs”
(Mite Dermatitis)**

Rash Illness



**“Katrinapox”
(Drug Reaction)**



Rash Illness

**“Cajun Crabs”
(Mite Dermatitis)**



**“Katrinapox”
(Drug Reaction)**



“Toxic Gumbo Gumba”



Rash Illness

**“Cajun Crabs”
(Mite Dermatitis)**



**“Katrinapox”
(Drug Reaction)**

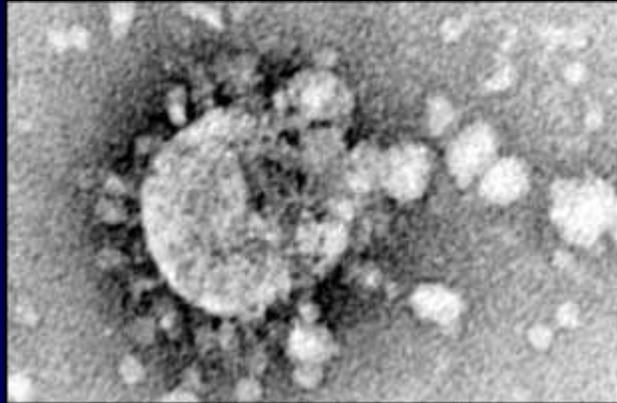


**“Toxic Gumbo Gumba”
(Community MRSA)**

Conclusion

- During outbreaks and responses there is a constant interplay between the laboratory and epidemiologic activities
- Iterative cycles of detection, confirmation, characterization, and survey provide information for intervention and prevention activities

Questions?



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